

WHAT IS CLAIMED IS:

1. A voltage regulator for controlling an output voltage of an alternator having a field winding, an output terminal connected to a battery through a power supply line, the voltage regulator comprising:

a field current control means connected to the field winding for controlling the field current of the field winding; and

an output voltage control means for controlling the field current control means by detecting at least one of an output voltage of the alternator and a terminal voltage of the battery, wherein the output voltage control means includes:

a high voltage pulse detecting means for detecting a high voltage pulse that is larger than a predetermined regulated voltage and exceeds a predetermined voltage that is smaller than a withstand voltage of a rectifier provided in the alternator, when it appears at the output terminal of the alternator;

a discriminating means for discriminating a first condition where a single high voltage pulse is generated when an electrical load connected to the power supply line is cut off and a second condition where the high voltage pulse is frequently and repeatedly generated when a failure occurs in the power supply line; and

an output control means for suppressing power generation of the alternator when the second condition is discriminated by the discriminating means.

2. The voltage regulator as in claim 1, wherein the failure that generates the high voltage pulses in the second condition is a connection failure occurred on the power supply line, and wherein the suppressing means suppresses a supply of field current to the field winding only when the second condition is discriminated in order to suppress power generation of the alternator.

3. The voltage regulator as in claim 2, wherein the discriminating means includes:

a pulse counting means for counting the number of high voltage pulse signals;

and

a pulse duration measuring means for measuring a pulse duration of the high voltage pulses.

4. The voltage regulator as in claim 3, wherein the pulse counting means includes a timer means to operate for a predetermined time from the input of the high voltage pulse signal in order to discriminate the first and second conditions based on the number of the pulse signals to be inputted during operation of the timer means.

5. The voltage regulator as in claim 4, wherein the pulse duration measuring means accumulates the duration of the high voltage pulse signal when the second condition is discriminated with the pulse counting means to determine the failure only when the accumulated duration exceeds a predetermined value.

6. The voltage regulator as in claim 2, wherein the discriminating means includes a storage means for storing the condition of the high voltage pulse as data and a reset signal generating means for resetting the data stored in the storage means after a predetermined time has passed.

7. A method for controlling power generation of an alternator for a vehicle comprising steps of:

detecting a high voltage pulse that is larger than a predetermined regulated voltage and exceeds a predetermined voltage smaller than a withstand voltage of a rectifier built in the alternator, when the pulse appears at an output terminal of the alternator;

discriminating a first condition where a single high voltage pulse is generated when an electric load connected to a power supply line is cut off and a second condition

where the high voltage pulse is frequently and repeatedly generated when a failure occurs in the power supply line; and

suppressing power generation of the alternator when the second condition is discriminated.

8. A voltage regulator for an alternator having a field winding, an armature winding, a full-wave rectifier connected with the armature winding, an output terminal of the full-wave rectifier connected to a battery through a power supply line, the voltage regulator comprising:

a field current control device connected in series with the field winding, which supplies field current to the field winding in response to a control signal; and

an output voltage regulating circuit connected with the field current control device, which generates the control signal to regulate output voltage of the alternator;

a high voltage pulse detecting circuit connected with the output terminal, which detects a high voltage pulse of which voltage is within a range between a regulated voltage regulated by the output voltage regulating circuit and a voltage that is smaller than a withstand voltage of a rectifier element provided in the full-wave rectifier;

a discriminating circuit connected with the high voltage pulse detecting circuit, which discriminates a serial high voltage pulses from a non-serial high voltage pulse indicative of disconnection of an electrical load from the power supply line; and

a suppressing circuit connected with the discriminating circuit, which modulates the control signal to suppress power generation of the alternator in response to a discrimination of the serial high voltage pulses.

9. The voltage regulator as in claim 8, wherein the suppressing circuit includes a gate circuit which blocks the control signal from the voltage regulator in response to a signal from the discriminating circuit.

10. The voltage regulator as in claim 9, wherein the discriminating circuit includes:

a timer circuit which generates the signal to be applied to the gate circuit for a predetermined time; and

a detecting circuit which detects the serial high voltage pulse including at least two of high voltage pulses, and initiates the timer circuit in response to a detection of the serial high voltage pulses.

11. The voltage regulator as in claim 10, wherein the detecting circuit includes:

a pulse duration measuring circuit which accumulates duration of the high voltage pulses and initiates the timer circuit when the accumulated duration reaches to a predetermined time.

12. The voltage regulator as in claim 11, wherein the detecting circuit further comprises:

a pulse counting circuit connected with the high voltage pulse detecting circuit, which counts number of high voltage pulse detecting circuit, which counts number of high voltage pulses and enables the pulse duration measuring circuit to accumulate duration when the count of high voltage pulses reaches at least two.